CLAIMS

1. An 8-oxoadenine compound shown by the formula (1):

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wherein ring A represents a 6-10 membered aromatic carbocyclic ring or a 5-10 membered heteroaromatic ring;

R represents a halogen atom, an alkyl group, a hydroxyalkyl group, a haloalkyl group, an alkoxy group, a hydroxyalkoxy group, a haloalkoxy group, amino group, an alkylamino group, a dialkylamino group, or a cyclic amino group;

n represents an integer of 0-2, and when n is 2, the Rs may be the same or different:

Z1 represents a substituted or unsubstituted alkylene group or a substituted or unsubstituted cycloalkylene group;

X² represents oxygen atom, sulfur atom, SO₂, NR⁵, CO, CONR⁵, NR⁵CO, SO₂NR⁵, NR⁵SO₂, NR⁵CONR⁶ or NR⁵CSNR⁶ (in which R⁵ and R⁶ are each independently hydrogen atom, a substituted or unsubstituted alkyl group, and a substituted or unsubstituted cycloalkyl group);

Y1, Y2 and Y3 represent each independently a single bond or an alkylene group;

X1 represents oxygen atom, sulfur atom, SO2, NR4 (wherein R4 is hydrogen atom or an alkyl group) or a single bond;

R² represents hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted alkynyl group or a substituted or unsubstituted cycloalkyl group; and

R1 represents hydrogen atom, hydroxy group, an alkoxy group, an alkoxycarbonyl group, a haloalkyl group, a haloalkoxy group, a substituted or unsubstituted aryl group, a substituted or unsubstituted heteroaryl

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group or a substituted or unsubstituted cycloalkyl group, or its pharmaceutically acceptable salt.

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2. The 8-oxoadenine compound according to claim 1, wherein ring A represents a 6-10 membered aromatic carbocyclic ring, or a 5-10 membered heteroaromatic ring containing 1-4 hetero atoms selected from 0-4 nitrogen atoms, 0-2 oxygen atoms and 0-2 sulfur atoms; R represents a halogen atom, an alkyl group of 1-6 carbons, a hydroxyalkyl group of 1-6 carbons, a haloalkyl group of 1-6 carbons, an alkoxy group of 1-6 carbons, a hydroxyalkoxy group of 1-6 carbons, a haloalkoxy group of 1-6 carbons, amino group, an alkylamino group of 1-6 carbons, a dialkylamino group in which each alkyl moiety has 1-6 carbons, and a cyclic amino group; n is an integer of 0-2, and when n is 2, Rs may be the same or different; Z¹ represents an alkylene group of 1-6 carbons or a cycloalkylene group of 3-8 carbons, which is optionally substituted by hydroxy group; X² represents oxygen atom, sulfur atom, SO₂, NR⁵, CO, CONR⁵, NR⁵CO, SO₂NR⁵, NR⁵SO₂, NR⁵CONR⁶ or NR⁵CSNR⁶ (in which R⁵ and R⁶ are independently hydrogen atom, a substituted or unsubstituted alkyl group of 1-6 carbons, and a substituted or unsubstituted cycloalkyl group of 3-8 carbons, wherein the substituents of the alkyl group or cycloalkyl group are selected from a halogen atom, hydroxy group, an alkoxy group of 1-6 carbons, carboxy group, an alkoxycarbonyl group of 2-5 carbons, carbamoyl group, amino group, an alkylamino group of 1-6 carbons, an dialkylamino group in which each alkyl moiety has 1-6 carbons, a cyclic amino group, carboxy group and tetrazolyl group which may be substituted by an alkyl group of 1-6 carbons.);

Y¹, Y² and Y³ represent each independently a single bond or an alkylene group of 1-6 carbons;

X¹ represents oxygen atom, sulfur atom, SO₂, NR⁴ (wherein R⁴ represents hydrogen atom or an alkyl group) or a single bond;

R² represents a substituted or unsubstituted alkyl group of 1-6 carbons, a substituted or unsubstituted alkenyl group of 2-6 carbons, a substituted or unsubstituted alkynyl group of 2-6 carbons or a substituted or unsubstituted cycloalkyl group of 3-8 carbons (wherein the substituent in the alkyl group, alkenyl group and alkynyl group is selected from a halogen atom, hydroxy group, an alkoxy group of 1-6 carbons, an acyloxy group of

2-10 carbons, amino group, an alkylamino group of 1-6 carbons, a dialklylamino group in which the each alkyl moiety has 1-6 carbons, and a cyclic amino group); and

R¹ represents hydrogen atom, hydroxy group, an alkoxy group of 1-6 carbons, an alkoxycarbonyl group of 2-5 carbons, a haloalkyl group of 1-6 carbons, a haloalkoxy group of 1-6 carbons, a substituted or unsubstituted aryl group of 6-10 carbons, a substituted or unsubstituted 5-10 membered heteroaryl group containing 1-4 hetero atoms selected from 0-4 nitrogen atoms, 0-2 oxygen atoms and 0-2 sulfur atoms, or a substituted or unsubstituted cycloalkyl group of 3-8 carbons;

and the said substituent in the aryl group, the heteroaryl group and the cycloalkyl group is selected from a halogen atom, hydroxy group, an alkyl group of 1-6 carbons, a haloalkyl group of 1-6 carbons, an alkoxy group of 1-6 carbons, a haloalkoxy group of 1-6 carbons, an alkylcarbonyl group of 2-5 carbons, amino group, an alkylamino group of 1-6 carbons and a dialkylamino group (wherein the each alkyl group has 1-6 carbons), and the said cyclic amino group represents a 4-7 membered saturated cyclic amino group containing 1-2 hetero atoms selected from 1-2 nitrogen atoms, 0-1 oxygen atom and 0-1 sulfur atom, which may be substituted with a halogen atom, hydroxy group, oxo group, an alkyl group of 1-6 carbons, an alkoxy group of 1-6 carbons, an alkylcarbonyl group of 2-5 carbons or an alkoxycarbonyl group of 2-5 carbons, in the formula (1) of

or its pharmaceutically acceptable salt.

the calim 1,

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- 3. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 1 or 2, wherein X² in the formula (1) of the calim 1 is oxygen atom, sulfur atom, NR⁵, SO₂, NR⁵SO₂ or NR⁵CONR⁶.
 - 4. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-3, wherein Y^3 in the formula (1) of the calim 1 is a single bond, methylene or ethylene.
 - 5. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1 to 4, wherein Z^1 in the formula (1) of the calim 1 is a straight chained alkyelne group of 1-6 carbons which may be substituted with hydroxy group.
 - 6. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-5, wherein X¹ in the formula (1) of the

calim 1 is oxygen atom or sulfur atom.

- 7. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-6, wherein Y^1 in the formula (1) of the calim 1 is a single bond or an alkylene group of 1-6 carbons.
- 8. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-7, wherein R¹ in the formula (1) of the calim 1 is hydrogen atom, an alkoxycarbonyl group, hydroxy group, or an alkoxy group.
- 9. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-8, wherein a group shown by the formula (2) in the formula (1) of the calim 1:

$$(R)_n$$
 COOR² (2)

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(wherein ring A, R, n, Y^3 and R^2 have the same meaning as in the formula (1))

is a group shown by the formula (3) or the formula (4):

$$R^3$$
 $COOR^2$
 R^3
 $COOR^2$
 R^3
 R^3
 $COOR^2$
 R^3
 R^3

(wherein R, n and R² have the same meaning as in the formula (1), and R³ is hydrogen atom or an alkyl group).

- 10. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 9, wherein R² is methyl group or an alkyl group of 2-6 carbons substituted by a dialkylamino group or a cyclic amino group.
- 11. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 9 or 10, wherein R³ is hydrogen atom.
- 12. A pharmaceutical composition comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.
- 13. An immuno-modulator comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an

active ingredient.

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- 14. A therapeutic or prophylactic agent for viral diseases, cancers or allergic diseases comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.
- 15. A medicament for topical administration comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.
- 16. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as a medicament.
- 17. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 for manufacturing an immuno-modulator.
- 18. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 for manufacturing a therapeutic or prophylactic agent for viral diseases, cancers and allergic diseases.
- 19. A method for modulating immune response which comprises administering to a patient, an effective amount of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11.
- 20. A method for treating or preventing viral diseases, cancers and allergic diseases which comprises administering to a patient, an effective amount of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11.
- 21. A process for preparing the 8-oxoadenine compound as claimed in any of claims 1-11 which comprises brominating a compound shown by the formula (10):

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wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same

defined in the claim 1, reacting the resultant with a metal alkoxide and the

reacting the resultant with a metal alkoxide and then hydrolyzing, or hydrolyzing the resultant.

22. A compound shown by the formula (10):

$$R^{1}$$
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{2}
 X^{2}
 X^{2}
 X^{2}
 X^{3}
 X^{3

wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z^1 are the same defined in the claim 1.

23. A process for preparing the 8-oxoadenine compound as described in any of claim 1-11 which comprises deprotecting a compound shown by the formula (11):

$$R^{1}$$
 X^{1}
 X^{1

wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same defined in the claim 1.

24. A compound shown by the formula (11):

$$R^{1}$$
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{1}
 X^{2}
 X^{2}
 X^{2}
 X^{2}
 X^{3}
 X^{3

wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same

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defined in the claim 1. 25. A compound or a pharmaceutically acceptable salt thereof selected from the group consisting of the following compounds: 2-Butoxy-8-oxo-9-[2-(3-methoxycarbonylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-[2-(3-methoxycarbonylmethylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylmethylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylmethylphenoxy)ethyl]adenine, 2-Butoxy-8-oxo-9-{2-[4-(2-methoxycarbonylethyl)phenoxy]ethyl}adenine, 2-Butoxy-8-oxo-9-[4-(3methoxycarbonylbenzenesulfonamide)butyl]adenine, 2-Butoxy-8-oxo-9-[4-(3methoxycarbonylmethylbenzenesulfonamide)butyl|adenine, 2-Butoxy-8-oxo-9-[4-(3methoxycarbonylphenylaminocarbonylamino)butyl|adenine, 2-Butoxy-8-oxo-9-[4-(3methoxycarbonylmethylphenylaminocarbonylamino)butylladenine, Methyl [3-({[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)ethyl]amino}methyl)phenyl]acetate, [3-({[2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)ethyl]amino}methyl)phenyl]acetic acid, Methyl 3-({[3-(6-mino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyl]amino}methyl)benzoate, 3-({[3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9vl)propyllamino\methyl\benzoic acid, Methyl 4-({[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyl]amino}methyl)benzoate, 4-({[3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyl|amino|methyl|benzoic acid, Methyl (3-{[[3-(6-amino-2-butoxy-8-oxo-9H-purin-9-yl)propyl](2-morpholin-4-ylethyl)amino|methyl}phenyl)acetate,

Ethyl 2-[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethoxy]benzoate,

yl)butyl|amino\methyl)phenyl|acetate,

Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-

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3-(Dimethylamino)propyl 2-[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-
         purin-9-yl)ethoxylbenzoate,
         Methyl 3-[4-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
         yl)butyl|amino\sulfonyl)phenyl|propanoate,
          3-[4-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
 5
         yl)butyl|amino}sulfonyl)phenyl|propanoic acid,
         Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-
          pyrrolidin-1-ylethyl)amino|sulfonyl}phenyl)acetate,
         (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-
          pyrrolidin-1-ylethyl)amino|sulfonyl}phenyl)acetic acid,
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         Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-
          methoxyethyl)amino|sulfonyl}phenyl)acetate,
          (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-
          methoxyethyl)amino|sulfonyl}phenyl)acetic acid,
         Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
15
         yl)butyl](methyl)amino|sulfonyl}phenyl)acetate,
          (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
         yl)butyl|(methyl)amino|sulfonyl}phenyl)acetic acid,
          Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-
          (dimethylamino)-2,2-dimethylpropyl]amino}sulfonyl)phenyl]acetate,
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          [3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-
          (dimethylamino)-2,2-dimethylpropyl]amino}sulfonyl)phenyl]acetic acid,
          Methyl [3-({[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
         yl)propyl]amino}sulfonyl)phenyl]acetate,
          Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](2-
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          hydroxy-2-methylpropyl)amino|sulfonyl}phenyl)acetate,
          (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-
          hydroxy-2-methylpropyl)amino|sulfonyl}phenyl)acetic acid,
          Methyl [3-({[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
          yl)ethyl|amino}sulfonyl)phenyl|acetate,
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          Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
          yl)butyl][(2R)-2,3-dihydroxypropyl]amino}sulfonyl)phenyl]acetate,
          [3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][(2R)-2,3-
          dihydroxypropyllamino}sulfonyl)phenyllacetic acid,
          Methyl 3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl][3-
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(dimethylamino)-2,2-dimethylpropyl]amino}sulfonyl)benzoate,

3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino}sulfonyl)benzoic acid, Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](3morpholin-4-ylpropyl)amino|methyl}phenyl)acetate, (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](3-5 morpholin-4-ylpropyl)amino|methyl}phenyl)acetic acid, Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino\methyl)phenyl\acetate, [3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino}methyl)phenyl]acetic acid, 10 Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(2-oxopyrrolidin-1-yl)propyl|amino}methyl)phenyl|acetate, [3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(2oxopyrrolidin-1-yl)propyl|amino|methyl)phenyl|acetic acid, Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2-15 morpholin-4-ylethyl)amino|methyl}phenyl)acetate, (3-{[[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl]butyl](2morpholin-4-ylethyl)amino|methyl}phenyl)acetic acid, Methyl (3-{[[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyl](3-morpholin-4-ylpropyl)amino|methyl}phenyl)acetate, 20 Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][2-(1H-tetrazol-5-yl)ethyl]amino}methyl)phenyl]acetate, Methyl (3-{|2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)ethyl]thio}phenyl)acetate, (3-{[2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-25 yl)ethyl]thio}phenyl)acetic acid, Methyl (3-{[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)ethyl|amino}phenyl)acetate, Methyl (3-{[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyl]amino}phenyl)acetate, 30 (3-{[3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyllamino}phenyl)acetic acid, Methyl [3-({[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9yl)propyllamino\methyl)phenyllacetate, ([3-([3-(6-Amino-2-butoxy-8-methoxy-9H-purin-9-35

yl)propyl|amino\methyl)phenyl|acetic acid,

Methyl (3-{[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](2-

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methoxyethyl)amino|methyl}phenyl)acetate,
         (3-{[[2-(6-Amino-2-butoxy-8-methoxy-9H-purin-9-yl)ethyl](2-
         methoxyethyl)amino|methyl}phenyl)acetic acid,
         Methyl (3-{[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
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         yl)ethyl|sulfonyl}phenyl)acetate,
         Methyl (3-{[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
         yl)ethyl](methyl)amino|methyl}phenyl)acetate,
         (3-{[[2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-
         yl)ethyl](methyl)amino|methyl}phenyl)acetic acid,
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         Methyl 4-[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)-2-
         hydroxypropoxy]benzoate,
         Methyl (3-{[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](2-
         hydroxyethyl)amino|methyl}phenyl)acetate,
         Methyl (3-{[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](2-
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         hydroxyethyl)amino|methyl}phenyl)acetate,
         2-Butoxy-8-oxo-9-[2-(3-hydroxycarbonylphenoxy)ethyl]adenine,
         2-Butoxy-8-oxo-9-[2-(3-hydroxycarbonylmethylphenoxy)ethyl]adenine,
         2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylphenoxy)ethyl]adenine,
         2-Butoxy-8-oxo-9-[2-(2-hydroxycarbonylmethylphenoxy)ethyl]adenine,
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         2-Butoxy-8-oxo-9-[2-(4-hydroxycarbonylphenoxy)ethyl]adenine,
         2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylmethylphenoxy)ethyl]adenine,
         2-Butoxy-8-oxo-9-{2-[4-(2-hydroxycarbonyolethyl)phenoxy]ethyl}adenine,
         2-Butoxy-8-oxo-9-[4-(3-hydroxycarbonylbenzenesulfonamide)butyl]adenine,
         2-Butoxy-8-oxo-9-[4-(3-
25
         hydroxycarbonylmethylbenzenesulfonamide)butyl|adenine,
         2-Butoxy-8-oxo-9-[4-(3-
         hydroxycarbonylphenylaminocarbonylamino)butylladenine and
         2-Butoxy-8-oxo-9-[4-(3-
         hydroxycarbonylmethylphenylaminocarbonylamino)butyl]adenine.
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